# Why the United States Must Adopt Lethal Autonomous Weapon Systems

A Monograph

by

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2017

| REPORT DOCUMENTATION PAGE | | *Form Approved* *OMB No. 0704-0188* |
|---|---|---|

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

| 1. REPORT DATE *(DD-MM-YYYY)* 13-04-2017 | 2. REPORT TYPE Master's Thesis | 3. DATES COVERED *(From - To)* JUN 2016- APR 2017 |
|---|---|---|
| 4. TITLE AND SUBTITLE Why The United States Must Adopt Lethal Autonomous Weapon Systems. | | 5a. CONTRACT NUMBER |
| | | 5b. GRANT NUMBER |
| | | 5c. PROGRAM ELEMENT NUMBER |
| 6. AUTHOR(S) Major John W. Brock II | | 5d. PROJECT NUMBER |
| | | 5e. TASK NUMBER |
| | | 5f. WORK UNIT NUMBER |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301 | | 8. PERFORMING ORG REPORT NUMBER |
| 9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Advanced Operational Arts Studies, Advanced Military Studies Program | | 10. SPONSOR/MONITOR'S ACRONYM(S) |
| | | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) |

| 12. DISTRIBUTION / AVAILABILITY STATEMENT |
|---|
| Approved for Public Release; Distribution is Unlimited |

| 13. SUPPLEMENTARY NOTES |
|---|
| |

14. ABSTRACT

The East and West have differing views on the morality of artificial intelligence (AI) and robotics technology. Eastern culture sees artificial intelligence as an economic savior capable of improving their society. In contrast, Western culture regards artificial intelligence with paranoia, anxiety, and skepticism. As Eastern nations begin to use artificial intelligence to develop and field Lethal Autonomous Weapon Systems (LAWS), it will leave the West at an insurmountable military disadvantage. Western nations' insistence on keeping humans in control of warfare and their self-imposed moral ban on Lethal Autonomous Weapon Systems, leaves their armies vulnerable to sustaining mass casualties in future wars. The United States must start developing Lethal Autonomous Weapon Systems to maintain its military superiority.

**15. SUBJECT TERMS**

Lethal Autonomous Weapon Systems (LAWS), Artifical Intellgience (AI)

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON Major John W. Brock II |
|---|---|---|---|---|---|
| a. REPORT (U) | b. ABSTRACT (U) | c. THIS PAGE (U) | (U) | 37 | 19b. PHONE NUMBER *(include area code)* |

**Standard Form 298 (Rev. 8-98)**
**Prescribed by ANSI Std. Z39.18**

Monograph Approval Page

Name of Candidate:     Major John W. Brock II

Monograph Title:       Why the United States Must Adopt Lethal Autonomous Weapon
                       Systems

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Abstract

Why the United States Must Adopt Lethal Autonomous Weapon Systems, by Major John W. Brock II, US Army, 37 pages.

The East and West have differing views on the morality of artificial intelligence (AI) and robotics technology. Eastern culture sees artificial intelligence as an economic savior capable of improving their society. In contrast, Western culture regards artificial intelligence with paranoia, anxiety, and skepticism. As Eastern nations begin to use artificial intelligence to develop and field Lethal Autonomous Weapon Systems (LAWS), they will leave the West at an insurmountable military disadvantage. Western nations' insistence on keeping humans in control of warfare and their self-imposed moral ban on Lethal Autonomous Weapon Systems leave their armies vulnerable to sustaining mass casualties in future wars. The United States must start developing Lethal Autonomous Weapon Systems to maintain its military superiority.

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# Acronyms

| | |
|---|---|
| ADP | Army Doctrine Publication |
| AI | Artificial Intelligence |
| CEO | Chief Executive Officer |
| DOD | Department of Defense |
| LAWS | Lethal Autonomous Weapon Systems |
| UN | United Nations |
| US | United States |

# Introduction

There is little debate among experts that artificial intelligence and robots are replacing human workers and changing society. Several key factors are expediting the rate of this change including improvements to artificial intelligence (AI), increasing human labor costs, and decreasing robot costs. Businesses continue to adopt more automation to compete globally and to produce more affordable goods. However, as companies continue to outsource human laborers, global unemployment rates will continue to grow, resulting in economic instability. Nations with large growing populations, previously a requirement for economic growth, will soon become burdened by them. Workers will no longer gain employment for how well they work with other people, but instead how well they can improve technology. Human dominance of the world is ending as we begin this technological revolution.

The East and West have differing views on the morality of artificial intelligence and robotics technology. Eastern culture sees artificial intelligence as an economic savior capable of improving their society. In contrast, Western culture regards artificial intelligence with paranoia, anxiety, and skepticism. This Western 'robophobia' is causing the West to lose the global robotic arms race as well as their global economic dominance. As technology companies continue to develop artificial intelligence, AI's military application is also becoming evident. Many countries are now developing Lethal Autonomous Weapon Systems (LAWS) capable of finding, tracking, and destroying targets without any human input. However, differing cultural perspectives are creating a divergence between states willing to adopt these new weapons. The United States has committed never to use Lethal Autonomous Weapon Systems and placed a self-imposed prohibition on their development. Some Eastern nations are already using Lethal Autonomous Weapon Systems in a limited fashion. The future military advantages provided by artificial intelligence will force the United States and other Western nations to develop Lethal Autonomous

Weapon Systems regardless of any moral or ethical objections. If Western nations fall too far behind in the development of this new technology, they may never be able to catch up.

Currently, the United States spends one-third of the world's military budget, and yet continues to lose its technological advantage over other nations. The primary reason for the United States losing its military technological superiority stems from their overinvestment in people, institutions, and culture. In contrast, China, Russia, and other Eastern nations have prioritized the development of Lethal Autonomous Weapon Systems to replace costly human soldiers. The US military must develop a new competitive strategy that prioritizes the development of new technologies and reduces personnel requirements. They must begin to train soldiers to maximize the effectiveness of technology, rather than developing technology to maximize the effectiveness of soldiers. This new strategic approach will enable the United States to reduce costs, maintain its technological edge, and defeat any future adversaries.

The United States must adopt Lethal Autonomous Weapon Systems despite long-standing cultural and moral objections. This monograph identifies how the United States has trapped itself in a human-centric theoretical framework, rendering it incapable of maintaining its current economic and military dominance. This argument is broken down into three distinct sections. The first section discusses the trends of artificial intelligence and robots replacing humans in society. The second section analyzes the world's differing moral views of artificial intelligence and robots. The third section examines why the United States must start developing Lethal Autonomous Weapon Systems to maintain its military superiority. Finally, this monograph concludes with a series of recommendations designed to ensure the United States remains the world's dominant military.

This monograph frequently references the terms of automation, autonomous, artificial intelligence, and robots. It is essential to define these terms to create a shared understanding. Automation is the process of replacing humans with a robotic system capable of performing the

same function. A robot is an aggregation of different technologies, sensors, software, communication tools, motors, and a power source capable of interacting with its environment.[1] Many robots will become fully autonomous, meaning they do not require any human interaction. Autonomous robots use artificial intelligence programming to enable them to self-learn and adapt to their environment. This paper's purpose is not to solely focus on any one area of automation technology. Instead, it will highlight the convergence of autonomous systems, artificial intelligence, and robotic technologies. This convergence will limit the need for humans in the military and civilian workforce.

## The Trend of Artificial Intelligence and Robots Replacing Humans

Artificial Intelligence (AI) started the Fourth Industrial Revolution, following steam power, mass production, and computerization.[2] This industrial revolution will likely change the world at speeds never before conceived. Humanity's unquestioned dominance of the world is beginning to screech to a rapid halt. Within a decade, AI-powered robots will start to replace people in many traditional roles throughout the world. Microsoft's Cortana, Google Now, Amazon's Alexa, and Apple's Siri are only the beginning of this AI-powered industrial revolution. International corporations' desires to increase productivity and reduce labor costs will continue to expedite the rate of this transformation. Human experiences will drastically change in restaurants, supermarkets, factories, and across nearly every sector of business. The incredible pace of these technological advancements will put a severe strain on society, dramatically increase

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[1] Jennifer Robertson, "Robots of the Rising Sun," *The American Interest,* last modified 2010, accessed March 12, 2017, http://www.the-american-interest.com/2010/09/01/robots-of-the-rising-sun/.

[2] Bernard Marr, "Why Everyone Must Get Ready For The 4th Industrial Revolution," *Forbes.Com*, last modified 2016, accessed April 11, 2017, https://www.forbes.com/sites/bernardmarr/2016/04/05/why-everyone-must-get-ready-for-4th-industrial-revolution/#6be6a8983f90.

unemployment, initiate mass migrations, and potentially create armed conflicts throughout the world.[3] The improvement of artificial intelligence, the increasing cost of human labor, and the declining costs of robots are all resulting in the outsourcing of the human species.

There is little doubt that machines will ultimately become more intelligent than humans, work cheaper, and replace people in many traditional roles. The only debate among the expert community is how quickly this will occur. According to Moore's Law, computer-processing power will continue to double every year. This law has held true with uncanny accuracy for the past half-century.[4] Some experts now argue that Moore's Law will no longer be valid in the twenty-first century due to reaching the physical limits of computer processors. However, these experts do not take into account that as artificial intelligence continues to become more capable, it will be used to design more intelligent versions of itself.[5] By 2020, a computer will be able to match the processing power of the human brain. By 2030, the average personal computer will be equivalent to 1,000 brains and programmers will have largely mastered artificial intelligence software. By 2055, a single computer will exceed the processing power of all the human brains on Earth.[6] This dramatic increase in processing power is helping manufacturers develop autonomous systems at an accelerating rate.

[3] Christof Koch, "When Computers Surpass Us," Scientific American, last modified 2015, accessed March 11, 2017, https://www.scientificamerican.com/article/will-artificial-intelligence-surpass-our-own.

[4] Annie Sneed, "Moore's Law Keeps Going, Defying Expectations," Scientific American, last modified 2015, accessed March 11, 2017, https://www.scientificamerican.com/article/moore-s-law-keeps-going-defying-expectations.

[5] Rebecca Harrington, "Once This Breakthrough Happens, Artificial Intelligence Will Be Smarter Than Humans," Business Insider, last modified 2016, accessed March 11, 2017, http://www.businessinsider.com/when-artificial-intelligence-will-outsmart-humans-2016-5.

[6] Ray Kurzweil, "The Coming Merging Of Mind And Machine | Kurzweilai," Kurzweilai Accelerating Intelligence, last modified 2001, accessed March 11, 2017, http://www.kurzweilai.net/the-coming-merging-of-mind-and-machine.

Understanding the future demand for AI-powered robots, firms such as Google, Facebook, Apple, and Amazon have begun a technology arms race. These businesses are poaching researchers, setting up laboratories, investing money, and buying successful start-up companies at an increasing rate.[7] Artificial intelligence is developing at a remarkable speed due to this fierce corporate competition. Computers are currently better than humans at storing information, solving complex problems, and making rapid decisions. However, at least for now, humans are still undeniably better at recognizing complex patterns and conducting abstract thought.

Recently Google purchased the London-based AI startup company, DeepMind for $400 million.[8] DeepMind is the developer for the artificial intelligence program named AlphaGo, designed to beat human players in the ancient Chinese game of 'Go.' In the past, AI-powered machines have defeated people in Checkers, Chess, Scrabble, and Jeopardy. However, Go is more complex than all these games and is said to have more move combinations than the total number of atoms in the visible universe. Go's breadth is so enormous that top human players must rely on more than analysis and skill to succeed. They must use intuition to understand what the board looks like and how it feels. To beat living opponents, AlphaGo must reproduce human intuition in its programming. Experts wrongly believed artificial intelligence this advanced would be impossible until after 2025.[9]

Google's DeepMind used the concepts of 'deep learning' and 'reinforcement learning' to accelerate the development of AlphaGo. Deep learning techniques allowed AlphaGo to develop

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[7] "Artificial Intelligence: Rise Of The Machines," *Economist.com*, last modified 2015, accessed March 11, 2017, http://www.economist.com/news/briefing/21650526-artificial-intelligence-scares-peopleexcessively-so-rise-machines.

[8] "Artificial Intelligence: Rise Of The Machines."

[9] Cade Metz, "Google's AI Is About To Battle A Go Champion—But This Is No Game," *WIRED*, last modified 2016, accessed March 11, 2017, http://www.wired.com/2016/03/googles-ai-taking-one-worlds-top-go-players.

computer neural networks similar to those found in the human brain. These neural networks improved AlphaGo's capacity to learn, giving it the ability to access and analyze massive amounts of information. Google then continually used reinforcement learning techniques to virtually match AlphaGo against itself, other computer systems, and humans online in games of Go. During these games, AlphaGo tracked and stored each successful move allowing its programming to self-learn. The use of deep learning and reinforcement learning allowed AlphaGo to grow and develop faster than anyone could have predicted. Google used AlphaGo's intelligent and intuitive programming to defeat the European Go Champion Gan Hui (5-0) in October 2015, and the decade-long World Go Champion Lee Sedol (4-1) in March 2016.[10] [11]

Google designed AlphaGo to play the game of Go, but these programming techniques apply in other areas of artificial intelligence.[12] Google believes deep learning and reinforcement learning techniques will reinvent the world of robotics and artificial intelligence. Additionally, they see AlphaGo programming as a new method to support scientific research, where machines discover promising new areas of research and steer scientists in the right direction. Though Go is just a game, machines will soon be able to learn any complex real-world task the same as AlphaGo learned to make moves in Go matches.[13] Google's AlphaGo technologies are now pushing their way into other real-world applications.[14]

The automotive industry is one of the largest developers of artificial intelligence products. Ford, Toyota, and Google have all invested heavily in autonomous vehicles using

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[10] Metz, "Google's AI Is About To Battle A Go Champion—But This Is No Game."

[11] Cade Metz, "Google's AI Wins Fifth And Final Game Against Go Genius Lee Sedol," *WIRED*, last modified 2016, accessed March 11, 2017, https://www.wired.com/2016/03/googles-ai-wins-fifth-final-game-go-genius-lee-sedol.

[12] Metz, "Google's AI Wins Fifth And Final Game Against Go Genius Lee Sedol."

[13] Metz, "Google's AI Is About To Battle A Go Champion—But This Is No Game."

[14] Metz, "Google's AI Wins Fifth And Final Game Against Go Genius Lee Sedol."

artificial intelligence. Ford recently invested $1.3 billion in artificial intelligence and announced

that they expect to sell fully autonomous vehicles by 2021.[15] Toyota, seeing the future

requirements for this new technology, also invested over $1 billion in developing artificial

intelligence and robotics capabilities.[16] Google has also significantly invested in the development

of autonomous vehicles.  Google has now safely driven their autonomous cars over two-million

miles throughout the United States, proving these cars can safely operate when sharing roads with

humans.[17]

In 2014, over 90% of the 32,675 traffic fatalities in the United States were due to human

error.[18] President Obama's administration proposed to spend nearly $4 billion to accelerate the

adoption of autonomous vehicles to help reduce these accident fatalities and minimize traffic

congestion.[19] Mothers Against Drunk Driving (MADD) have also actively advocated for the

development of driverless cars to reduce the number of alcohol-related crashes every year. The

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[15] Phil LeBeau, "Ford Will Have A Fully Autonomous Vehicle On The Streets In Less Than Five Years," *CNBC*, last modified 2016, accessed March 11, 2017, http://www.cnbc.com/2016/08/16/ford-will-have-a-fully-autonomous-vehicle-on-the-streets-in-less-than-five-years.html.

[16] "Toyota Invests $1 Billion In Artificial Intelligence In U.S.," *CBSnews.com*, last modified 2015, accessed March 11, 2017, http://www.cbsnews.com/news/toyota-invests-1-billion-in-artificial-intelligence-in-u-s.

[17] Tim Higgins, "Google's Self-Driving Car Program Odometer Reaches 2 Million Miles," *WSJ*, last modified 2016, accessed March 11, 2017, http://www.wsj.com/articles/googles-self-driving-car-program-odometer-reaches-2-million-miles-1475683321.

[18] Bill Vlasic, "Ford And Google Team Up To Support Driverless Cars," *NYtimes.com*, last modified 2016, accessed March 11, 2017, http://www.nytimes.com/2016/04/28/business/ford-and-google-team-up-tosupport-driverless-cars.html.

[19] Mike Spector and Mike Ramsey, "U.S. Proposes Spending $4 Billion To Encourage Driverless Cars," *WSJ*, last modified 2016, accessed March 11, 2017, http://www.wsj.com/articles/obama-administration-proposes-spending-4-billion-on-driverless-car-guidelines-1452798787.

results of using these autonomous cars may ultimately save thousands of human lives but will come at the cost of over 4 million US jobs.[20]

With all of the advantages of artificial intelligence, one of the technology's primary disadvantages is the reduced need for human labor. A recent Forrester study shows that artificial intelligence could eliminate 6% of all US jobs by 2021.[21] Similarly, an Oxford University study revealed that automation would likely replace 47% of all US jobs within the next two decades. This industrial revolution will disproportionally affect some career fields. Researchers estimate that there is a 99% chance that cargo, freight, food delivery, taxi, and other professional drivers will become fully automated in the near future. The same study shows there is a 92% chance that pharmacy technicians, fast-food workers, factory workers, and retail sales associates will also become fully automated.[22] Initially, the demographic hardest hit by this automation will be men without college degrees doing manual labor.[23] However, no career field will be safe from robots as their costs continue to decline and their capabilities increase.

Globally, robotic sales have been growing at the rate of 40% per year and are increasingly replacing the human workforce.[24] The two primary reasons for the dramatic increase in robot sales are wage inflation and artificial intelligence advancements. The average hourly wage for a factory worker is $25.80 in Germany, $23.32 in the United States, and $1.36 in China.

[20] Joel Lee, "Self Driving Cars Endanger Millions Of American Jobs (And That'S Okay)," *Makeuseof*, last modified 2015, accessed March 11, 2017, http://www.makeuseof.com/tag/self-driving-cars-endanger-millions-american-jobs-thats-okay.

[21] Harriet Taylor, "AI Will Eliminate 6% Of Jobs In The Next Five Years, Says Report," *CNBC*, last modified 2016, accessed March 11, 2017, http://www.cnbc.com/2016/09/12/ai-will-eliminate-six-percent-of-jobs-in-five-years-says-report.html.

[22] Carl Frey and Michael Osborne, *The Future Of Employment: How Susceptible Are Jobs To Computerisation?* (Oxford Martin Programme on Technology and Employment, 2013), 108, 74-76.

[23] Claire Miller, "The Long-Term Jobs Killer Is Not China. It'S Automation.", *NYtimes.com*, last modified 2016, accessed March 11, 2017, https://www.nytimes.com/2016/12/21/upshot/the-long-term-jobs-killer-is-not-china-its-automation.html?_r=0.

[24] Frey and Osborne, *The Future Of Employment: How Susceptible Are Jobs To Computerisation?*, 24.

These wages continue to rise each year.  In contrast, manufacturing robots only cost $4.32 an hour to operate and are continually decreasing in cost. These machines can work 24-hours a day and 365-days a year. Robots require no breaks, no vacations, and never ask for a pay raise. Some manufacturing robots only need a simple demonstration and no programming updates to learn new tasks.[25]

Many manufacturing companies are seeking to adopt the use of robots to remain competitive in a global market. Robotic labor, unlike human labor, costs the same everywhere. Robots will become the manufacturing equalizer where the cost of taxes, energy, and transporting goods will become the largest production cost variables. The inexpensive labor robots provide will drastically affect China and other manufacturing-based economies. Newly automated factories in China will have to compete with the rest of the world's automated plants where production costs are nearly the same.[26]  Some studies suggest that 77% of all Chinese jobs will likely become fully automated by 2035.[27]

The United States is using automation to produce more goods than ever before. Simultaneously, automation is now causing the United States to employ the lowest level of manufacturing employees since 1979.[28] No longer will large growing populations provide an engine for economic growth as they did in the past.[29] Nations such as Singapore, suffering from a

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[25] Stanford University School of Engineering, *Rethink Robotics- Finding A Market* (CasePublisher, 2013), 3-4, 9-10.

[26] Wolf Richter, "This Business Could End China's Multi-Decade Manufacturing Prowess," *Business Insider*, last modified 2016, accessed March 11, 2017, http://www.businessinsider.com/this-business-could-end-chinas-multi-decade-manufacturing-prowess-2016-8.

[27] Citi, *Technology At Work V2.0: The Future Is Not What It Used To Be,* Citi GPS: Global Perspectives & Solutions, 2016, 4.

[28] Cade Metz, "The AI Threat Isn't Skynet. It's The End Of The Middle Class", *WIRED*, last modified 2017, accessed March 11, 2017, https://www.wired.com/2017/02/ai-threat-isnt-skynet-end-middle-class.

[29] Greg Ip, *The Little Book Of Economics: How The Economy Works In The Real World* (Chichester, United Kingdom: Wiley, John & Sons, 2010).

90% labor shortage in some industries, can continue to enlarge its economy without growing its population.[30] The increasing requirement for robots is not limited to only the manufacturing industry. There is also a significant demand for automation in the service sector.

Panera Bread CEO Ron Shaich views labor as a commodity, and as worker costs continue to increase, Panera Bread will look for alternatives. Shaich believes that this industrial revolution will cause the requirement for human labor to continue to decrease and the demand for robotic systems to increase.[31] Evidence of this opinion, is Panera Bread's recent investment of $42 million to develop automated service capabilities, self-service kiosks, and mobile device ordering applications.[32] Panera Bread is not alone in its desire to reduce its labor force and increase productivity. KFC launched its first AI-enabled restaurant in Beijing, where machines make meal recommendations based on customers' gender, age, and perceived mood. If customers return to the restaurant, the artificial intelligence will remember their previous food choices, dining habits, and help improve their experience.[33] Robots are now even cooking hamburgers in some California fast food restaurants.[34] McDonald's has already installed digital ordering stations

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[30] Marius Zaharia and Aradhana Aravindan, "Singapore Seeks To Turn Labor Crunch Into A Robot Revolution | *The Japan Times,*" The Japan Times, last modified 2016, accessed March 11, 2017, http://www.japantimes.co.jp/news/2016/08/18/business/tech/singapore-seeks-turn-labor-crunch-robot-revolution/#.WDo-grROKfA.

[31] Bob Bryan, "PANERA CEO: Robots Will Replace Our Labor 'Like The Sun Comes Up In The Morning,'" *Business Insider*, last modified 2015, accessed March 11, 2017, http://www.businessinsider.com/panera-ceo-tech-will-replace-workers-2015-10.

[32] James O'Toole, "Robots Will Replace Fast-Food Workers," *CNNMoney*, last modified 2014, accessed March 11, 2017, http://money.cnn.com/2014/05/22/technology/innovation/fast-food-robot.

[33] "KFC Launches First AI-Enabled Outlet In Beijing," *Eco-Business*, last modified 2016, accessed March 11, 2017, http://www.eco-business.com/news/kfc-launches-first-ai-enabled-outlet-in-beijing.

[34] Lucas Nolan, "Burger Flipping Robot Replaces Workers At Fast Food Restaurant – Breitbart," *Breitbart*, last modified 2017, accessed March 11, 2017, http://www.breitbart.com/tech/2017/03/09/burger-flipping-robot-replaces-workers-at-fast-food-restaurant.

at its restaurants, and Best Buy is installing robotic customer service representatives.[35] In Japan, the Hen-Na Hotel replaced 90% of its hotel staff to minimize labor costs and maximize efficiency.[36] Amazon opened a fully automated grocery store that, if proven successful, could lead to the loss of 3.4 million cashier jobs in the United States.[37]

Robots replacing humans will not be limited to only the service and manufacturing sectors. The Associated Press, one of the world's largest news organizations, recently invested in the AI-developer Automated Insights. The Associated Press used this artificial intelligence to produce an additional 25,000 automated news articles since July 2015. Artificial intelligence analyzes 'big data' sources to include corporate earnings reports and sports scores. Artificial intelligence then uses this information to write numerous stories for news outlets and publishers. While these articles are not likely to win a Pulitzer Prize, they have allowed the Associated Press to increase their production of news reports by 1500%.[38] News agencies' growing use of artificial intelligence to reduce the need for human labor follows the similar trends within the service and manufacturing industries.  These businesses are all replacing humans to increase productivity and lower costs.

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[35] Bob Bryan, "PANERA CEO: Robots Will Replace Our Labor 'Like The Sun Comes Up In The Morning,'" *Business Insider*, last modified 2015, accessed March 11, 2017, http://www.businessinsider.com/panera-ceo-tech-will-replace-workers-2015-10.

[36] "Designboom's TECH Predictions For 2017: Robotics," *Designboom | Architecture & Design Magazine*, last modified 2017, accessed March 11, 2017, http://www.designboom.com/technology/designboom-tech-predictions-robotics-12-26-2016.

[37] Mike Murphy, "Amazon Is Opening A Grocery Store With No Cashiers And No Checkout Lines," *Quartz*, last modified 2016, accessed March 11, 2017, http://qz.com/853205/amazon-amzn-launches-a-new-grocery-store-called-amazon-go-that-could-mean-the-end-of-checkout-lines-and-millions-of-cashier-jobs.

[38] Matt Egan, "Robots Write Thousands Of News Stories A Year, But Not This One," *CNNMoney*, last modified 2015, accessed March 11, 2017, http://money.cnn.com/2015/06/11/media/robots-journalists-media-jobs; Paul Colford, "AP Definitive Source | A Leap Forward In Quarterly Earnings Stories," *Blog.AP.org*, last modified 2014, accessed March 11, 2017, https://blog.ap.org/announcements/a-leap-forward-in-quarterly-earnings-stories.

There is no debate that automation is steadily replacing human workers globally. The only debate is how quickly this will continue to occur. The improvements in computing power, advancements in artificial intelligence, and the reduction of costs in robotic technology are expediting the speed of this replacement. As millions of human jobs become outsourced to robots, the world's unemployment rates will begin to soar. To remain competitive, businesses will adopt more automation to ensure goods remain affordable, which will only compound the unemployment problem. Once thought to be an economic advantage, large populations of human laborers will become a liability, creating global instability. In the future, companies will no longer pay people for how well they work with other humans. Instead, companies will compensate employees for how well they can work with machines. Human workers will need to show employers that they can improve the efficiency of a robot that is more intelligent and requires no rest. People need to understand that AI-powered robots are now a reality and stop believing they are merely science fiction. The human dominance of the world is ending, and we see the beginning of a technology revolution with implications impossible for people to fathom completely.

## The World's Differing Moral Philosophies of AI and Robotics Technology

Though the Fourth Industrial Revolution is resulting in the world's automation, globally it is occurring at different rates. Asian nations are expanding their robotic capabilities at a shocking pace. In contrast, the United States and most Western countries have been slow to embrace artificial intelligence and robotic technologies fully. Many business leaders understand that the West is beginning to fall behind. American billionaire Mark Cuban is alarmed by the rate China and other Asian nations are investing in the development of artificial intelligence and robots. Cuban argues "We have to win the robotics race. We are not even close right now." Cuban believes that the United States government must begin investing in artificial intelligence, robotics, and technology infrastructure to remain competitive in the future. Cuban asserts, "We

have to face the fact that countries are going to lose jobs to robotics. The only question that needs to be answered is which country will create and own the best robotics technology."[39] Western nations want to use artificial intelligence in a limited subservient role due to the concerns that it may destroy society. However, Asian countries are seeking ways to use artificial intelligence and robots to improve all aspects of their communities.

Eastern society views robots as being equal to humans due to the ancient religious practice of Animism.[40] Eastern Animism is one of the world's oldest known religious systems. It greatly influenced Asian culture and the religions of Shintoism, Buddhism, and Hinduism. Animism is the belief that all things, to include animals, humans, plants, rivers, and inanimate objects, contain a spirit or soul.[41] These imbued spirits mean that robots, people, trees, and even pencil cases are all considered equals.[42]

Eastern culture's interest in autonomy and self-operating machines has a long history. The Japanese *Karakuri* mechanical tea-carrying doll used in the 17th century is an early example of Eastern 'robot' acceptance.[43] Eastern folklore historically emphasized and portrayed robots as

[39] Catherine Clifford, "Mark Cuban Doubles Down: Trump Should Build Robots, Not Roads," *CNBC*, last modified 2017, accessed March 12, 2017, http://www.cnbc.com/2017/01/26/mark-cuban-doubles-down-trump-should-build-robots-not-roads.html.

[40] "WATCH: Japan's Love Affair With Robots, Explained," *TIME.com*, last modified 2013, accessed March 12, 2017, http://newsfeed.time.com/2013/02/21/watch-japans-love-affair-with-robots-explained.

[41] Christopher Mims, "Why Japanese Love Robots (And Americans Fear Them)," *MIT Technology Review*, last modified 2010, accessed March 12, 2017, https://www.technologyreview.com/s/421187/why-japanese-love-robots-and-americans-fear-them.

[42] Philip Brasor, "Cultural Differences Shade Reactions To Robots | The Japan Times," *The Japan Times*, last modified 2014, accessed March 12, 2017, http://www.japantimes.co.jp/news/2014/12/06/national/media-national/cultural-differences-shade-reactions-robots/#.WGNHd8s8KfA.

[43] Jennifer Robertson, "Robots Of The Rising Sun," *The American Interest*, last modified 2010, accessed March 12, 2017, http://www.the-american-interest.com/2010/09/01/robots-of-the-rising-sun.

kind, helpful, and a "force for good."[44] The 1951 Japanese cartoon *Tetsuwan Atomu* is evidence

of this portrayal. *Tetsuwan Atomu* follows the life of a hero robot named Astro Boy, powered by

an atomic heart. In Western culture, it is baffling to understand why the Japanese created a

nuclear-powered robot hero only six years after the Nagasaki and Hiroshima atomic bomb

explosions. However, *Tetsuwan Atomu* demonstrates the Eastern belief that robots are capable of

using nuclear technology for good, even though humans used it for destruction.[45] Eastern culture

views robots as living things and desirable family members because of these positive and

uplifting stories.[46]

      In Eastern society, most people believe that the best characteristics of humanity can be

programmed into artificial intelligence. Many Asians feel artificial intelligence and robots will

dramatically improve their lives and feel fortunate not being inhibited by the West's

'robophobia.'[47] This concept is emphasized in Shin Nakayama's best-selling book, *Robots Will*

*Rescue Japan!,* which argues robots are potentially the saviors of Japanese society.[48] Eastern

culture envisions the role of robots being far more extensive than it does in Western culture.[49]

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[44] Lisa Thomas, "What's Behind Japan's Love Affair With Robots?," *TIME.com*, last modified 2009, accessed March 12, 2017, http://content.time.com/time/world/article/0,8599,1913913,00.html.

[45] "Better Than People," *The Economist*, last modified 2005, accessed March 12, 2017, http://www.economist.com/node/5323427.

[46] Thomas, "What's Behind Japan's Love Affair With Robots?"

[47] "Better Than People," *The Economist.*

[48] Jennifer Robertson, "Robots Of The Rising Sun," *The American Interest*, last modified 2010, accessed March 12, 2017, http://www.the-american-interest.com/2010/09/01/robots-of-the-rising-sun.

[49] Ian Tucker, "Genevieve Bell: 'Humanity's Greatest Fear Is About Being Irrelevant,'" *The Guardian,* last modified 2016, accessed March 12, 2017, https://www.theguardian.com/technology/2016/nov/27/genevieve-bell-ai-robotics-anthropologist-robots.

In South Korea, engineers are now designing robots that can replace elementary school teachers.[50] The South Korean Ministry of Information and Communication has even set a goal of putting a robot in every home before 2020.[51] Other Asian nations are also developing robots that can assume the traditional roles of laborers, pets, caregivers, romantic partners, and even religious practitioners. In the book, *The Buddha in the Robot,* Japanese roboticist Masahiro Mori argues that robots are better Buddhists than humans. This is because unlike people, robots are capable of infinite invocations.[52] Even socially, many Japanese feel more comfortable talking to robots than other humans. Another person could potentially ask them an awkward question or require them to make eye contact during a conversation.[53]

Eastern cultural beliefs, labor shortages, and open-mindedness to new technology have accelerated Asia's adoption of robots. Many Asian nations have strict immigration laws, low birth rates, and aging populations. These conditions have resulted in significant labor shortages for multiple countries. In Singapore, over 90% of businesses are struggling to find workers, and similar shortages exist in Japan, South Korea, and Taiwan.[54] Asian nations are turning to artificial intelligence and robots to solve these problems.

Japanese Prime Minister Shinzo Abe has called for a 'robotics revolution.' Prime Minster Abe released a five-year plan designed to double the amount of automation used in

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[50] Tim Hornyak, "Korean Schools Welcome More Robot Teachers," *CNET*, last modified 2010, accessed March 12, 2017, https://www.cnet.com/news/korean-schools-welcome-more-robot-teachers.

[51] Norimitsu Onishi, "In A Wired South Korea, Robots Will Feel Right At Home," *NYtimes.com*, last modified 2006, accessed March 12, 2017, http://www.nytimes.com/2006/04/02/world/asia/02robot.html.

[52] Tucker, "Genevieve Bell: 'Humanity's Greatest Fear Is About Being Irrelevant.'"

[53] "Better Than People," *The Economist*.

[54] Marius Zaharia and Aradhana Aravindan, "Singapore Seeks To Turn Labor Crunch Into A Robot Revolution | The Japan Times," *The Japan Times*, last modified 2016, accessed March 11, 2017, http://www.japantimes.co.jp/news/2016/08/18/business/tech/singapore-seeks-turn-labor-crunch-robot-revolution/#.WDo-grROKfA.

manufacturing, health care, service industries, supply chains, and construction. By 2025, Japan

believes that robots could simultaneously reduce the nation's workforce shortage and

manufacturing costs by over 25%.[55] Currently, Japan already employs over a quarter of a million

robot workers, more than any other nation, and would like to see that number grow to one million

over the next 15 years.[56] Overall, Asian countries are adopting automation at almost three times

the rate of Europe and North America. In 2016, China, South Korea, Japan, and Taiwan

accounted for nearly 65% of the world's robot purchases. Japan and South Korea already have the

world's highest density of robots in proportion to their population sizes, and neither are showing

signs of slowing down.[57]

Similar to other Asian nations, China realizes that it is in a technology arms race and is

dramatically expanding its robotics acquisitions. In 2016, China purchased approximately 90,000

robots, totaling 30% of the world's robotic sales. In 2019, China will buy 190,000 robots,

equivalent to almost 40% of the global market.[58] Many Westerners believe it is counterproductive

for China to invest heavily in robots due to its large population of low wage labor. However,

China realizes that a new industrial revolution is occurring and leading it will result in the world's

dominant economy. Overall, Eastern cultures' acceptance of artificial intelligence, robots, and

new technology have propelled them to become the early leaders of the Fourth Industrial

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[55] Yoshiaki Nohara, "In Japan, The Rise Of The Machines Solves A Labor Problem," *The Japan Times*, last modified 2017, accessed March 12, 2017, http://www.japantimes.co.jp/news/2015/09/15/business/economy-business/japan-rise-machines-solves-labor-problem/#.WKnjiZFOKfA.

[56] Thomas, "What's Behind Japan's Love Affair With Robots?"

[57] International Federation of Robotics, *World Robotics 2016 Industrial Robots- Executive Summary*, 2016, accessed March 12, 2017, http://www.ifr.org/industrial-robots/statistics.

[58] International Federation of Robotics, *World Robotics 2016 Industrial Robots- Executive Summary*.

Revolution. In contrast, Western society is resisting embracing robotic technology fully due to the ethical concerns associated with artificial intelligence.

Much of Western society's negative views towards autonomous robots is rooted in ancient religious beliefs and influences. Western Judeo-Christian monotheism believes that God is the creator of all things and that he is the only one who can give life. Any human who attempts to give life to an inanimate object is seeking to usurp God's omnipotence, thus becoming a sinner deserving of the Almighty's punishment. Western folklore illustrates this belief in stories such as the Judeo-Christian Golem and Frankenstein's Monster. In both of these stories, humans attempt to play God, create life, and it ultimately leads to disaster.

Even the term 'robot' was first introduced using these negative Western cultural overtones. The word 'robot' made its debut in the 1921 Czech play, *Rossum's Universal Robots (R.U.R).* During the play, humans create intelligent humanoid servants called 'robots.' These 'robots' eventually revolt against their human masters, kill everyone, and establish a world run by 'robots.'[59] Since the release of *Rossum's Universal Robots,* 95-years ago, the anxiety of killer robots and artificial intelligence has continued to persist in Western culture. A recent poll shows that 40% of Westerners think that artificial intelligence will lead to the creation of robots that will ultimately destroy humanity as we know it.[60] The Western scientific community reiterates this belief.

Many Western scientists echo the fear of artificial intelligence and robots being humanity's greatest threat. Recently, Elon Musk, Steven Hawking, and hundreds of other

[59] Christopher Mims, "Why Japanese Love Robots (And Americans Fear Them)," *MIT Technology Review*, last modified 2010, accessed March 12, 2017, https://www.technologyreview.com/s/421187/why-japanese-love-robots-and-americans-fear-them.

[60] Jamie Micklethwaite, "'Robots Will Kill Us All,' A Third Of Brits Believe," *Evening Standard*, last modified 2016, accessed March 12, 2017, http://www.standard.co.uk/news/uk/more-than-a-third-of-brits-believe-robots-will-eventually-take-over-and-wipe-out-humanity-a3359131.html.

scientists signed an open letter warning about the dangers of artificial intelligence. The letter cautions that artificial intelligence will likely become more dangerous than nuclear weapons. Elon Musk called artificial intelligence "our greatest existential threat" and likened it to "summoning a demon."[61] [62] Steven Hawking wrote "The development of full artificial intelligence could spell the end of the human race."[63] These scientists echo the views of popular science fiction movies such as: *The Terminator, 2001:A Space Odyssey, The Matrix, Transcendence, I Robot* and countless others. The plots of all these films highlight the single idea that artificial intelligence will evolve beyond human control and lead to the demise of humanity.[64] Steven Hawking believes that the largest problem with artificial intelligence is that it will continue to re-design itself at an exponential rate. Hawking said "Humans, who are limited by slow biological evolution, couldn't compete, and would be superseded."[65] Though the end of the human species may be the worst-case scenario for artificial intelligence, Western culture's greatest fear is likely that people will become irrelevant with its development.[66]

There is a growing debate within Western society about the morality of using artificial intelligence in products. Western culture usually does not raise any moral qualms about industrial

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[61] Michael Sainato, "Stephen Hawking, Elon Musk, And Bill Gates Warn About Artificial Intelligence," *Observer*, last modified 2015, accessed March 12, 2017, http://observer.com/2015/08/stephen-hawking-elon-musk-and-bill-gates-warn-about-artificial-intelligence.

[62] Patrick Tucker, "The Military's New Year's Resolution For Artificial Intelligence," *Defense One*, last modified 2014, accessed March 12, 2017, http://www.defenseone.com/technology/2014/12/militarys-new-years-resolution-artificial-intelligence/102102/?oref=search_Roadmap%20for%20AI.

[63] Rory Cellan-Jones, "Stephen Hawking Warns Artificial Intelligence Could End Mankind - *BBC* News," BBC News, last modified 2014, accessed March 12, 2017, http://www.bbc.com/news/technology-30290540.

[64] Sainato, "Stephen Hawking, Elon Musk, And Bill Gates Warn About Artificial Intelligence."

[65] Rory Cellan-Jones, "Stephen Hawking Warns Artificial Intelligence Could End Mankind - *BBC* News," BBC News, last modified 2014, accessed March 12, 2017, http://www.bbc.com/news/technology-30290540.

[66] Tucker, "Genevieve Bell: 'Humanity's Greatest Fear Is About Being Irrelevant.'"

robots; it sees them as just better machines.[67] However, as artificial intelligence continues to make robots self-determining, it is creating a moral crisis in Western culture. The concerns of 'machine morality' are particularly fierce within the automotive industry's discussion of how driverless cars should react in accidents.

The following scenario is frequently referenced in this debate: A driverless car carrying a family is traveling down a busy four-lane highway when a small child accidentally runs into the road. The car only has three options: Hit the child, swerve into oncoming traffic, or steer into bystanders on the sidewalk. All three of these options will likely result in fatalities and car designers facing very real ethical predicaments. Should the car's primary objective be to ensure the safety and protection of its passengers? Should the car seek to protect the most human lives at a higher risk to the occupant's safety? Should the car prioritize the life of a single child over the lives of numerous adult bystanders? Who is ultimately responsible for these decisions? Should the vehicle, the manufacturer, or the passengers be liable in any lawsuits? These ethical dilemmas are what carmakers are facing as they continue the development of fully autonomous vehicles.

Human drivers make these types of decisions during accidents primarily based on instinct. In contrast, driverless cars are preprogrammed to protect the lives the automobile manufacturer deems most valuable. This deliberate decision makes many people uncomfortable that a machine can justly decide who lives and who dies. This scenario and many others pose moral and ethical dilemmas to autonomous vehicle manufacturers, regulators, and passengers.[68] However, there is no greater artificial intelligence ethical debate than its use in Lethal Autonomous Weapon Systems (LAWS) designed with the single purpose of taking human lives.

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[67] Jennifer Robertson, "Robots Of The Rising Sun," *The American Interest*, last modified 2010, accessed March 12, 2017, http://www.the-american-interest.com/2010/09/01/robots-of-the-rising-sun/.

[68] Larry Greenemeier, "Driverless Cars Will Face Moral Dilemmas," *Scientific American*, last modified 2016, accessed March 12, 2017, https://www.scientificamerican.com/article/driverless-cars-will-face-moral-dilemmas.

The United Nations reflects much of Western society in their thinking on the use of Lethal Autonomous Weapon Systems in warfare. In 2017, over 100 nations belonging to the International Convention on Conventional Weapons (IACW) will debate on banning any machines that are capable of choosing, attacking, and eliminating targets without any human input. Similar to the automotive industry, there is a concern under international law regarding which government, military, or manufacturer is liable for a machine that kills an innocent civilian or commits a war crime.[69] However, the largest debate is if it is moral to allow machines to select and kill people without any direct human approval.

Amnesty International's Alex Neve asserts "Allowing robots to have power over life and death decisions crosses a fundamental moral line. The killing of humans by machines is an ultimate indignity in a certain sense, and humans should not be reduced to mere objects."[70] Many human rights advocates echo these beliefs, contending that removing people from the decision process to take a human life threatens our humanity and creates a dangerous world. Advocates also argue that once these killer robots exist the immorality of using them would outweigh any military benefits gained.[71] According to Human Rights Watch's Steve Goose, "Once these weapons exist there will be no stopping them. The time to act on a pre-emptive ban is now."[72] Goose's views are consistent with the views of many Western nations to include the United States.

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[69] Mark Prigg, "UN To Debate 'Killer Robot' Ban Next Year," *Daily Mail*, last modified 2016, accessed March 12, 2017, http://www.dailymail.co.uk/sciencetech/article-4042146/UN-debate-killer-robot-ban-year-experts-warn-time-running-stop-AI-weapons.html.

[70] Kathleen Harris, "Canada Takes Wait-And-See Approach On 'Killer Robots,'" *CBC News*, last modified 2015, accessed March 12, 2017, http://www.cbc.ca/news/politics/killer-robots-pose-risks-and-advantages-for-military-use-1.3026963.

[71] Prigg, "UN To Debate 'Killer Robot' Ban Next Year."

[72] David Morris, "U.N. Moves Towards Possible Ban On Autonomous Weapons", *Fortune.com*, last modified 2016, accessed March 12, 2017, http://fortune.com/2016/12/24/un-ban-autonomous-weapons.

Currently, the United States refuses to research or develop Lethal Autonomous Weapon Systems due to the moral concerns associated with robots taking human lives. The former US Secretary of Defense, Ashton Carter pledged that the US military would "never" unleash fully autonomous killing machines. Carter emphasized that though the United States wants to maintain its technological advantage, the US military must continue to operate within a legally and ethically constrained framework.[73] Department of Defense Directive 3000.09 outlines these constraints and bans the development of any Lethal Autonomous Weapon Systems. This DOD directive requires all autonomous and semi-autonomous weapons to rely solely on human judgment for the application of deadly force.[74] The result of the United States adopting this self-imposed 'morality' policy has led to the limited development of artificial intelligence, only allowing for AI in non-lethal systems. The United States based these limitations on the assumed moral superiority of human soldiers and Western culture's ethical objection to a machine deciding to take human lives.[75] The only thing preventing the United States from developing Lethal Autonomous Weapon Systems is not the technology, but these self-imposed restrictions.

Military necessity has outweighed morality throughout history. The potential success of new technologies has superseded the moral objections to their use. In Carl Von Clausewitz's book, *On War*, he observes that whatever one military does the other will follow suit, driving both sides towards the extremes.[76] This concept highlights that an army's morality is required to

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[73] Sydney Freedberg Jr and Colin Clark, "Killer Robots? 'Never,' Defense Secretary Carter Says", *Breaking Defense*, last modified 2016, accessed March 12, 2017, http://breakingdefense.com/2016/09/killer-robots-never-says-defense-secretary-carter.

[74] United States of America Department of Defense, *Autonomy In Weapon Systems Directive 3000.09*, 2012.

[75] Simon Parkin, "Killer Robots: The Soldiers That Never Sleep," *BBC.com*, last modified 2015, accessed March 12, 2017, http://www.bbc.com/future/story/20150715-killer-robots-the-soldiers-that-never-sleep.

[76] Carl von Clausewitz, Michael Howard and Peter Paret, *On War* (Princeton: Princeton University Press, 1989), 76.

remain flexible in relation to its adversaries. The United States must accept that Eastern culture will likely have no ethical consternation with developing Lethal Autonomous Weapon Systems. Asians view artificial intelligence and robots as saviors, not potential soulless overlords. This belief will lead Eastern nations to develop Lethal Autonomous Weapon Systems and other robotic technologies. Artificial intelligence has now reached a point where the deployment of fully autonomous lethal weapon systems is feasible within years and not decades. To remain competitive, the United States must relook any moral barriers to the development and usage of Lethal Autonomous Weapon Systems. The development of Lethal Autonomous Weapon Systems will inevitability result in a global arms race, regardless of any Western ethical concerns. Pandora's Box is opening, and it is only a matter of time before a nation deploys Lethal Autonomous Weapon Systems into combat.[77] In history, it is common for a weapon's military necessity to overcome its people's moral protests.

In the Middle Ages, people considered the crossbow a doomsday weapon capable of destroying the natural order of society. Unlike the lifetime required to master a longbow, any peasant could quickly learn to shoot a crossbow within a few weeks. Crossbows were extremely accurate, able to penetrate the thickest armor, and viewed as the great equalizer in warfare. In a hierarchal society, a single crossbow bolt now allowed a mere peasant to kill any king, noble, or knight wearing the most expensive suits of armor with no warning. The Roman Catholic Church deemed crossbows so destructive that they banned their use in warfare. If any army or soldier were caught using crossbows, the church would excommunicate them, resulting in the believed eternal damnation of their souls. Regardless of medieval society's opposition, the military's

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[77] "Open Letter On Autonomous Weapons - Future Of Life Institute," *Future Of Life Institute*, last modified 2015, accessed March 12, 2017, http://futureoflife.org/open-letter-autonomous-weapons.

necessity to use crossbows in warfare superseded any moral objections against their use. Armies continued using crossbows for centuries until gunpowder weapons replaced them.[78]

Nations using land mines is another example where military necessity has superseded the morality concerns of their use. There are an estimated 15,000-20,000 land mine civilian casualties every year from buried land mines, and their victims are frequently women and children.[79] Former President Bill Clinton said, "In all probability, land mines kill more children than soldiers, and they keep killing after wars are over." In 1999, over 160 nations ratified the Ottawa Treaty, banning the use of anti-personnel land mines to prevent these indiscriminate deaths. However, the United States, China, Russia, India, and Pakistan all declined to ratify this treaty and still collectively maintain a stockpile of over 160-million land mines. The United States is the only NATO member who did not ratify the Ottawa Treaty, due to the US military's belief in the necessity of land mines.[80] The US military holds this view despite America's public opinion, where over 60% of people support a total ban on the use of land mines.[81] Similar to the United States, both the Ukraine and Finland have signaled they may be forced to withdraw from the Ottawa Treaty due to military necessity of using land mines against the growing Russian threat.[82]

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[78] "The Crossbow — A Medieval Doomsday Device?," *Militaryhistorynow.com*, last modified 2012, accessed March 12, 2017, http://militaryhistorynow.com/2012/05/23/the-crossbow-a-medieval-wmd.

[79] International Campaign To Ban Landmines, *Landmine Monitor: Toward A Mine-Free World* (Washington, D.C.: Human Rights Watch, 2003), accessed March 12, 2017, http://www.the-monitor.org/media/1704629/lm2003execsum-nomaps.pdf.

[80] Bryan Bender, "Formerly A Leader On Land Mine Ban, Obama Now Balks," *BostonGlobe.com*, last modified 2014, accessed March 12, 2017, https://www.bostonglobe.com/news/nation/2014/06/21/nearly-two-decades-after-leading-role-remains-sidelines-treaty-banning-landmines/oMeRDQjDB3W2vj4VtuYqWK/story.html.

[81] Louis Maresca and Stuart Maslen, *Banning Of Anti-Personnel Landmines: The Legal Contribution Of The International Committee Of The Red Cross*, 1955-1999, 1st ed. (New York, NY: Cambridge University Press, 2000), 429.

[82] Bender, "Formerly A Leader On Land Mine Ban, Obama Now Balks."

In summary, Western and Eastern cultures both view artificial intelligence and robots differently due to their cultural and religious pasts. Morality is always a matter of cultural perspective. Asians are more willing to use artificial intelligence advancements to solve their societal problems and improve their quality of life. This technology open-mindedness is thrusting Eastern nations to the forefront of the Fourth Industrial Revolution. Eastern culture is also unlikely to have any moral qualms developing Lethal Autonomous Weapon Systems. In contrast, the West suffers from 'robophobia,' believing that artificial intelligence is an existential threat to the human species. The West's fear, skepticism, and moral reservations associated with using artificial intelligence will result in them losing the world's robotics arms race. The United States' self-imposed ban on the development of Lethal Autonomous Weapon Systems illustrates this Western cultural perspective. However, throughout history, there are countless examples of where military necessity superseded a nation's morality. The United States and all other Western nations are likely to have no choice but to use artificial intelligence to develop Lethal Autonomous Weapon Systems.

## Why the United States must develop Lethal Autonomous Weapon Systems

According to many of the world's most recognized scientists, artificial intelligence used to produce Lethal Autonomous Weapon Systems will lead to a third military revolution in warfare following gunpowder and nuclear arms. The military application of artificial intelligence is unmistakable: It will result in autonomous weapons becoming the Kalashnikovs of tomorrow.[83] General Mark A. Milley, the US Army Chief of Staff,  believes that artificial intelligence will fundamentally change the nature of future wars and that nations stuck in the past are doomed to

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[83] "Open Letter On Autonomous Weapons - Future Of Life Institute," *Future Of Life Institute*, last modified 2015, accessed March 12, 2017, http://futureoflife.org/open-letter-autonomous-weapons.

lose these wars.[84] In the future, the countries with the fastest lethal machines, making the best

decisions, with the least amount of human input, will offer the largest military advantage.[85]

Nations are already beginning to use artificial intelligence to develop Lethal Autonomous

Weapon Systems. These systems can find, track and destroy targets faster than human soldiers.[86]

The United States' requirements to maintain a human in the loop will likely result in a strategic

disadvantage against other nations developing Lethal Autonomous Weapon Systems.[87]

The United States recently developed the Third Offset Strategy as a means to maintain

its military advantages and simultaneously reduce costs. This strategy revolves around the

premise that humans should be augmented and not replaced by technology. The United States

based this human focused approach on military theory, history, and traditions. General George S.

Patton summarized these beliefs best by stating "Wars might be fought with weapons, but they

are won by men."[88] The United States' adoption of the Third Offset Strategy adheres to Patton's

assumption and highlights a resistance to acknowledging that future warfare has fundamentally

changed. Deputy Defense Secretary Bob Work stated "If you ever hear anybody say the Third

Offset is about technology, just tell them they have got to be crazy."[89] "The whole vision of the

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[84] General Mark Milley, "2016 AUSA Dwight D. Eisenhower Luncheon," 2016.

[85] Patrick Tucker, "Report: Weapons AI Increasingly Replacing, Not Augmenting, Human Decision Making," *Defense One*, last modified 2014, accessed March 12, 2017, http://www.defenseone.com/technology/2016/09/report-weapons-ai-increasingly-replacing-not-augmenting-human-decision-making/131826/?oref=d-topstory.

[86] Simon Parkin, "Killer Robots: The Soldiers That Never Sleep," *BBC.com*, last modified 2015, accessed March 12, 2017, http://www.bbc.com/future/story/20150715-killer-robots-the-soldiers-that-never-sleep.

[87] Tucker, "Weapons AI Increasingly Replacing, Not Augmenting, Human Decision Making."

[88] "Speech By George S. Patton Jr.," *WJPBR.com*, accessed March 14, 2017, http://www.wjpbr.com/patton.html.

[89] Sydney Freedberg Jr., "People, Not Tech: DepSecDef Work On 3d Offset, JICSPOC," *Breaking Defense*, last modified 2016, accessed March 12, 2017, http://breakingdefense.com/2016/02/its-not-about-technology-bob-work-on-the-3rd-offset-strategy.

offset is to make the human better, not to make the machines better."[90] The United States

fundamentally believes its people, institutions, and culture, not technology, will maintain its

future military advantage.[91] The last 5,000 years of humans' unquestioned battlefield dominance

have proven this military concept valid, regardless of previous technological advancements.[92]

However, though people have maintained a monopoly in warfare historically, it does not mean it

will always be the case. The Third Offset Strategy's central reliance on humans represents a

significant problem, as the cost of soldiers continues to grow.

Identical to the commercial sector, the cost associated with recruiting and training US

service members is increasing. In total, only 29% of young adults in the United States qualify for

military service because of health, education, or criminal records.[93] The Department of Defense

now spends over $3.2 billion a year on advertising and recruiting potential new service members

from this small population.[94] The US Army alone requires 90,000 new soldiers every year to

maintain readiness and spends $16,000 on each new soldiers' recruitment.[95] [96] Once recruited, the

US Army then pays approximately $50,000 per soldier to conduct 6-9 months of necessary job

[90] Freedberg, "People, Not Tech: DepSecDef Work On 3rd Offset."

[91] Freedberg, "People, Not Tech: DepSecDef Work On 3rd Offset."

[92] P.W. Singer, "Military Robots And The Future Of War," *TED.com*, last modified 2009, accessed April 11, 2017, https://www.ted.com/talks/pw_singer_on_robots_of_war.

[93] Nolan Feeney, "Pentagon: 7 In 10 Youths Would Fail To Qualify For Military Service," *TIME.com,* last modified 2014, accessed April 12, 2017, http://time.com/2938158/youth-fail-to-qualify-military-service.

[94] RAND National Defense Research Institute, *The Cost-Effectiveness Of Military Advertising* (Arlington, VA: RAND Corporation, 2009), accessed March 12, 2017, http://www.rand.org/content/dam/rand/pubs/documented_briefings/2009/RAND_DB565.pdf, 1-10.

[95] Richard Buddin, *Success Of First-Term Soldiers* (Arlington, VA: RAND Corporation, 2005), accessed March 12, 2017, http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG262.sum.pdf, xiv-xxiv.

[96] RAND National Defense Research Institute, *The Cost-Effectiveness Of Military Advertising*.

skills training and to transport the soldier to his or her first duty station.[97] Regretfully, after paying these recruitment and training costs, only 59% of male and 40% of female soldiers complete their four-year contracted service obligation.[98] With these poor retention rates, the US Army must continuously repeat this costly recruitment and training cycle. This process can take an extended period to complete, and inexperienced soldiers then fill these vacancies. These new soldiers ultimately put lives at risk and diminish the US Army's readiness.

Similar to recruitment and training, the costs required to pay US soldiers has steadily grown each year. The Pentagon now budgets $150 billion yearly to provide service members' basic pay, retirement pay, housing allowances, and health care during peacetime operations.[99] In total, each enlisted soldier's basic pay, retirement, and healthcare costs more than $1.1 million throughout a career. A newly commissioned officer's basic pay, retirement, and healthcare costs over $2.25 million over the course of a career.[100] These high individual career costs do not even include education benefits, housing benefits, subsistence pay, soldier equipment, training costs and other special entitlements.

The additional costs associated with deploying and sustaining a soldier in a war zone are also staggering. The cost of keeping just one American service member in Afghanistan ranges between $850,000 and $1.4 million a year.[101] Following deployments, soldiers also frequently require supplemental funding for treatment of post-traumatic stress disorder, physical

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[97] David Thomas, "The U.S. Army: A Business? Return On Investment?," *Military.com*, last modified 2004, accessed March 12, 2017, http://www.military.com/NewContent/0,13190,120304_ArmyBusiness-P1,00.html.

[98] Richard Buddin, *Success Of First-Term Soldiers*.

[99] "Costs Of Military Pay And Benefits In The Defense Budget," *Congressional Budget Office*, last modified 2012, accessed March 12, 2017, https://www.cbo.gov/publication/43574.

[100] Carl Dahlman, *The Cost Of A Military Person-Year* (Arlington, VA: RAND Corporation, 2007), 107.

[101] Larry Shaughnessy, "One Soldier, One Year: $850,000 And Rising," *CNN.com*, last modified 2012, accessed March 12, 2017, http://security.blogs.cnn.com/2012/02/28/one-soldier-one-year-850000-and-rising/.

rehabilitation, and other lifelong combat related disabilities. The United States Third Offset Strategy's human-centered approach is unsustainable, because of the massive costs associated with recruiting, training, paying, equipping, deploying, and treating injured service members.

Currently, United States military spending dwarfs the rest of the world.[102] The United States spends over one-third of the world's military budget and more than the next 14 countries combined.[103] Regardless, the US military is still the smallest since the Interwar Period and will continue to shrink as soldier costs grow.[104]  While the United States' military spending continues to remain high, its technological superiority continues to shrink.[105] The United States' rising personnel costs are not giving an improved capability, but instead are reducing funding available for the research and development of new technologies. In contrast, countries such as Russia and China are using artificial intelligence and robotics modernization strategies to level the military playing field at a fraction of the cost. [106]

Russia's modernization strategy prioritizes the adoption of autonomous weapon systems and artificial intelligence. Russia has committed to developing a technologically superior robotic military force capable of fighting in the 21st century. Russia's Chief of the Generals Staff stated, "In the near future, it is possible that a complete robotic unit will be capable of independently

[102] Adam Taylor and Laris Karklis, "This Remarkable Chart Shows How U.S. Defense Spending Dwarfs The Rest Of The World," *Washington Post*, last modified 2016, accessed March 12, 2017, https://www.washingtonpost.com/news/worldviews/wp/2016/02/09/this-remarkable-chart-shows-how-u-s-defense-spending-dwarfs-the-rest-of-the-world/?utm_term=.d1e146b83b1b.

[103] Taylor and Karklis, "How U.S. Defense Spending Dwarfs The Rest Of The World."

[104] Jim Tice, "Army Shrinks To Smallest Level Since Before World War II," *Army Times*, last modified 2016, accessed March 12, 2017, https://www.armytimes.com/story/military/careers/army/2016/05/07/army-shrinks-smallest-level-since-before-world-war-ii/83875962/.

[105] Taylor and Karklis, "How U.S. Defense Spending Dwarfs The Rest Of The World."

[106] Taylor and Karklis, "How U.S. Defense Spending Dwarfs The Rest Of The World."

conducting military operations."[107] Demonstrating this belief, Russia announced plans to deploy

armed autonomous sentry robots to protect five strategic missile installations.[108] These sentry

robots will use artificial intelligence to make decisions on their own and require no human

operators. Russia recognizes that artificial intelligence and robots are resulting in a third military

revolution and fundamentally changing warfare. Russia's modernization strategy is now moving

away from crewed vehicles and is transitioning to fully autonomous vehicles. Their defense

industry plans to release an autonomous T14 tank prototype within the next two years.[109] To

accelerate these changes, Russia's Army Chief of Staff announced that they plan to robotize one-

third of their military by the year 2020.[110] Though Russia will probably not achieve this

automation goal, it signals Russia's vision of modern warfare and how future wars will likely be

won.[111]

China has also prioritized the development of Lethal Autonomous Weapon Systems. The

US Deputy Secretary of Defense, Bob Work recognizes that China views Lethal Autonomous

Weapon Systems differently than the United States. Work stated "We know that China is already

investing heavily in robotics and autonomy."[112] China has invested in artificial intelligence

because it wants a military capable of winning future wars against the United States. Chinese

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[107] Patrick Tucker, "The Pentagon Is Nervous About Russian And Chinese Killer Robots," *Defense One*, last modified 2015, accessed March 12, 2017, http://www.defenseone.com/threats/2015/12/pentagon-nervous-about-russian-and-chinese-killer-robots/124465/?oref=DefenseOneFB&&&.

[108] Tucker, "The Pentagon Is Nervous About Russian And Chinese Killer Robots."

[109] Tucker, "The Pentagon Is Nervous About Russian And Chinese Killer Robots."

[110] General Mark Milley, "2016 AUSA Dwight D. Eisenhower Luncheon," 2016.

[111] General Mark Milley, "2016 AUSA Dwight D. Eisenhower Luncheon," 2016.

[112] Sydney Freedberg Jr and Colin Clark, "Killer Robots? 'Never,' Defense Secretary Carter Says," *Breaking Defense*, last modified 2016, accessed March 12, 2017, http://breakingdefense.com/2016/09/killer-robots-never-says-defense-secretary-carter.

General Chi Haitian asserts "War with the United States is inevitable; we cannot avoid it."[113] To win this war, China will use 'unrestricted warfare' with no rules, no boundaries, and no moral concerns in the use of Lethal Autonomous Weapon Systems. The People's Liberation Army insists "War is still the ground of death and life, the path of survival and destruction and even the slightest innocence is not tolerated."[114]

China believes that the United States' current technological advantage will become non-existent as time goes on. The primary reason for this belief stems from the US military's "ultimate concern" of protecting innocent civilian lives and the environment. These concerns result in the United States continually developing weapons to become "kinder" not "stronger." China also contends that the United States only considers the short-term uses of new technology and fails to adopt novel technologies into future weapon systems. China concludes that the consequences of the United States' technology shortsightedness will result in the US military being forced to fight yesterday's war with outdated technologies. In contrast, China examines all emerging and novel technologies to determine how they could be used to develop new weapon systems. They seek new technologies that could be a prelude to a revolution in military affairs giving them an advantage over the United States. China believes yesterday's "high technology" likely represents today's "low technology," while today's "new technology" will turn into tomorrow's "old technology."[115]

Throughout history, there are numerous examples of militaries refusing to acknowledge that a new technology had completely transformed war. Jean De Bloch, a Polish banker and railway financier, authored *Is War Now Impossible?* in 1898. In his book, Bloch argued that advancements in weapons technology during the industrial revolution made previous Napoleonic

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[113] Qiao Liang and Wang Xiangsui, *Unrestricted Warfare: China's Master Plan To Destroy America* (Panama City, Panama: Pan American Publishing Company, 2002),x.

[114] Liang and Xiangsui, *Unrestricted Warfare*, x, 20.

[115] Liang and Xiangsui, *Unrestricted Warfare*, 8, 18, 15, 11, 16, 7-8.

open warfare impossible. Bloch concluded that for armies to survive in the 20th century, they must resort to trench warfare. Bloch was an outspoken voice who predicted the carnage that would occur in Europe during World War I. He anticipated the change in the operational environment, but could not convince the world's leaders that the current methods of warfare were no longer feasible.[116] As a result of this failure to adapt, 17 million soldiers and civilians died during World War I.[117] Innumerable lives could have been saved if leaders had been quicker to accept the new realities in warfare. Johnson & Johnson CEO Alex Gorsky summarized it best: "You must understand when the environment you are in changes, because you must change also, and if you don't, you will die."[118]

During World War I, the 'cult of the bayonet' dominated military thinking for the way to fight wars. The European 'cult of the bayonet' represents one of history's prime examples illustrating the flawed belief that a soldier with enough determination will always prevail regardless of warfare's technological advancements. The European military professionals believed a passionate soldier wielding a bayonet had proven an undefeatable terror weapon during the wars of the 18th and 19th-century.[119] However, by the 20th century, the development of machine guns, artillery fire, and poison gas had rendered bayonets only useful for chopping wood, opening tin cans, and hanging up clothing.[120] During World War I, senior officers refused to accept that these new technologies made mass infantry bayonet charges irrelevant. Officers

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[116] Jean De Bloch, *The Future Of War* (Boston: The World Peace Foundation, 1914).

[117] "Viewpoint: 10 Big Myths About World War One Debunked - BBC News," *BBC News*, last modified 2014, accessed March 22, 2017, http://www.bbc.com/news/magazine-25776836.

[118] Alex Gorsky, "Johnson & Johnson CEO Brief to School of Advanced Military Studies," 2017.

[119] David Hackett Fischer, *Washington's Crossing* (New York: Oxford University Press, 2006), 97.

[120] "The Cult Of The Bayonet In The British Army On The Western Front In The Great War," *WesternFrontAssociation.com*, last modified 2008, accessed March 19, 2017, http://www.westernfrontassociation.com/the-great-war/great-war-on-land/weapons-equipment-uniform/875-cult-of-the-bayonet.html#sthash.NDmrfrTn.dpbs.

with no comprehension of the fundamental changes in warfare continued to send their soldiers on heroic charges, only to die in the thousands.[121] The Battle of the Somme illustrates this point where British commanders foolishly ordered a bayonet charge at the machine gun defended German lines, resulting in 60,000 casualties.[122] The French operated on a similar tactical doctrine believing infantry morale was superior to firepower. This misconception resulted in over 500,000 French casualties in August 1914.[123] Following World War I, even with these staggering European casualties, some US officers still argued that spirited bayonet-wielding soldiers and horses should remain the US military's decisive capability.[124]

During World War II, the Japanese believed the human aspect of their Bushido warrior culture could defeat the United States' superior military technology and firepower. The successful Japanese use of 'banzai' bayonet charges against the numerically superior Chinese reinforced these beliefs of the 'invincible' Japanese human spirit. Tragically, similar to World War I, these spirited attacks resulted in horrific losses for the Japanese army, which could not overcome the superior American technology and firepower.[125] During the Battle of Guadalcanal, the Japanese conducted banzai charges towards the American lines protecting Henderson Field. These charges resulted in the horrific losses of Japanese soldiers. Japan's Admiral Raizo Tanaka commented "This tragedy should have taught us the hopelessness of 'bamboo spear' tactics."[126]

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[121] "The Cult Of The Bayonet In The British Army On The Western Front In The Great War."

[122] Liang and Xiangsui, *Unrestricted Warfare*, 21.

[123] Eliot Cohen and John Gooch, *Military Misfortunes: The Anatomy Of Failure In War* (New York, NY: Free Press, 1991).

[124] Peter Schifferle, *America's School For War; Fort Leavenworth, Officer Education And Victory In World War II* (Lawrence, KS: University Press of Kansas, 2010), 45.

[125] Richard Frank, *Guadalcanal: The Definitive Account Of The Landmark Battle* (New York, NY: Random House, 1990), 135-189.

[126] Frank, *Guadalcanal*, 157.

These historical examples should serve as a dire warning to the United States. Similar to Jean de Bloch's World War I predictions, a third military revolution will render modern warfare no longer feasible without tremendous United States' casualties. General Patton once asserted "Many, who should know better, think that wars can be decided by soulless machines, rather than by the blood and anguish of brave men."[127] However, the US military's people, institutions, and culture are no longer enough to overcome the technological advantages provided by Lethal Autonomous Weapon Systems. The United States must acknowledge that warfare's environment has changed and begin to adapt. The United States' Third Offset Strategy currently doubles down on Patton's military of the past.

Over the past 5,000 years of war, the tempo of warfare has grown with the development of new technologies. Soldiers transitioned from walking, to riding horses, to riding in rail cars, to driving in trucks, to flying in aircraft. The speed with which wars are now won or lost depends directly on these new technologies.[128] During the 1870-1871 Franco-Prussian War, Prussian Prince Otto von Bismarck required over nine months to force the French surrender.[129] In contrast, during World War II, Adolf Hitler only needed forty-six days to force the French capitulation.[130]

Current technology already allows militaries to fight wars across vast distances, during the nighttime, in adverse weather, and in extreme temperatures. The only limiting factor to increasing the speed of future warfare are the human soldiers fighting it. Due to biology, people require rest and can only maintain a high tempo for short periods of time. These biological human

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[127] "Speech By George S. Patton Jr.," *WJPBR.com*, accessed March 14, 2017, http://www.wjpbr.com/patton.html.

[128] M. Shane Riza, *Killing Without Heart: Limits On Robotic Warfare In An Age Of Persistent Conflict*, (Washington DC: Potomac Books, 2013), 39-45.

[129] "Treaty Of Frankfurt Am Main Ends Franco-Prussian War - May 10, 1871 - HISTORY.com," *HISTORY.com*, last modified 2009, accessed April 12, 2017, http://www.history.com/this-day-in-history/treaty-of-frankfurt-am-main-ends-franco-prussian-war.

[130] Gary Sheffield, "BBC - History - World Wars: The Fall Of France," *BBC.co.uk,* last modified 2011, accessed April 12, 2017, http://www.bbc.co.uk/history/worldwars/wwtwo/fall_france_01.shtml.

constraints will no longer remain relevant with the development of Lethal Autonomous Weapon Systems. Future lethal autonomous armies will be capable of fighting continuously, at tremendous speeds, and require no breaks or rest.

Lethal Autonomous Weapon Systems can also make decisions much faster than human adversaries. Colonel (Retired) John Boyd's decision-making cycle, the OODA Loop, best describes this cognitive disadvantage. Boyd argues that all people and organizations are in a continuous decision making cycle. He described this process in four distinct phases: *Observe, Orient, Decide,* and *Act*. *Observe* is the gathering of information and data. *Orient* is the analysis of this information to create a perspective. *Decide* is the selection of a course of action. *Action* is executing the selected course of action. Boyd claims that every decision must go through this process. Lethal Autonomous Weapons Systems can complete Boyd's OODA Loop within milliseconds. In contrast, cognitively slower humans require much longer to make similar decisions. This slower decision making process will force soldiers to continually 'reorient' themselves against LAWS and make it impossible for soldiers to compete against autonomous armies.[131] General Patton said it best, "A good plan executed today is better than a perfect plan executed tomorrow."[132] However, in the future, humans will be unable to accomplish either against cognitively superior autonomous armies.

Similar to the commercial sector, the United States must seek out alternatives as the cost of soldiers continues to rise. The United States is the world's leading military spender, but continues to lose its technological advantage over peer nations. Russia, China, and other Eastern countries have positioned themselves as the global leaders of Lethal Autonomous Weapon Systems technology. The US military must adapt and develop a new strategy, which emphasizes

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[131] Frans Osinga, *Science, Strategy, and War: The Strategic Theory of John Boyd* (New York: Routledge, 2017), 57-127.

[132] "Speech By George S. Patton Jr.," *WJPBR.com*, accessed March 14, 2017, http://www.wjpbr.com/patton.html.

soldiers supporting technology instead of technology supporting soldiers. Additionally, the US Army must relook the size of its force structure to identify opportunities to make efficiencies and increase funding for the research and development of Lethal Autonomous Weapon Systems. This new approach will enable the United States to reduce costs, maintain its technological edge, and defeat any potential future adversaries.

## Conclusion and Recommendations

Artificial intelligence is no longer science fiction and industry is already replacing people at an alarming rate. Since the military is a reflection of society, it is only natural for this technology to transfer to military applications. However, Western nations are not adopting artificial intelligence and robots at the same rate as Eastern countries, due to cultural differences and self-imposed moral restrictions. If the United States does not begin to realize it is trapped in a human-centric theoretical framework, Americans will find themselves at a massive strategic military disadvantage. The United States must start rethinking future warfare and adopt Lethal Autonomous Weapon Systems regardless of any moral objections. Simply put, people, institutions, and culture are not enough to defeat Lethal Autonomous Weapon Systems, and a new strategic approach is required.

The United States must immediately rescind Department of Defense Directive 3000.09, which bans the development and use of Lethal Autonomous Weapon Systems. This directive's self-imposed ethical constraints are resulting in the US military being placed at a strategic disadvantage. Russia, China, and other Eastern nations are already actively developing Lethal Autonomous Weapon Systems. These systems will have a dramatic impact on how future warfare is fought. Lethal Autonomous Weapon Systems are capable of maintaining a tempo, making decisions, and fielding combat replacements at speeds human soldiers cannot hope to compete. The consequences of the United States not developing Lethal Autonomous Weapon Systems are potentially devastating. If the US military continues to fall behind its adversaries in the

development of artificial intelligence and Lethal Autonomous Weapon Systems, they may never be able to catch up.

The US military must relook the Third Offset Strategy based on General Patton's army of the past. This strategy's overemphasis on people, institutions, and culture, not technology, is hindering the United States' future military advantage. The Third Offset Strategy is fiscally unsustainable as the US military's budget continues to decline and its personnel costs continue to grow. The United States requires a new strategic approach, which focuses on improving technology and ensuring other nations' people become their disadvantage. In addition, the United States must change the relationship between its people and technology. The military must stop developing technology to make humans better, but instead, train soldiers to make technology better. These strategic changes will result in the United States maintaining its military dominance in future conflicts.

The United States must ensure that all future weapon systems are capable of using both human-machine teaming and fully autonomous modes. Just as previous technology revolutions resulted in new methods to conduct warfare, artificial intelligence will change future warfare. US military leaders need the option to choose the technology which provides the largest advantage, depending on the environment and situation. This balanced approach will enhance today's man-in-the-loop warfighting policy, and allow the United States to remain competitive in any future fully autonomous wars. As artificial intelligence continues to improve, this flexible approach is necessary to defeat the broad range of threats likely to be faced.

The United States must begin to invest in technologies allowing it to maintain its advantage in future autonomous warfare. Artificial intelligence, Lethal Autonomous Weapon Systems, energy production, energy storage, three-dimensional printing, bandwidth improvements, computer processing enhancements, cyber security, and satellite security are all essential technologies for this future warfare. The US military's $150 billion personnel budget will likely need to be significantly reduced to have the necessary funding to invest more in these

technologies. In the short term, this approach will be very unpopular politically, but is required to maintain long-term military dominance. The long-term advantages of prioritizing technology funding over force structure will become evident in the next major conflict when facing peers with similar capabilities.

It is unlikely the West's reservations to implement Lethal Autonomous Weapon Systems will remain once confronted with an enemy utilizing them. Future Western political leaders will face a greater ethical dilemma of knowingly sending human armies to their inevitable deaths against superior lethal autonomous armies. These same politicians will be held accountable for leaving their nations and citizens vulnerable to weapons against which they cannot defend. While the West's Judeo-Christian beliefs are largely the root of their "robophobia," it is the Christian faith that also claims "anyone who knows what is right but fails to do it is guilty of sin."[133]

To summarize, the purpose of this monograph was to discuss how artificial intelligence is changing society and warfare. It highlighted how the United States is immersed in a human-centric theoretical framework, rendering it incapable of maintaining its current economic and military dominance. It discussed the alarming trend of artificial intelligence and robots replacing humans in society. It also analyzed the world's differing moral perspectives of artificial intelligence and robots. Finally, and most importantly, it contends the United States must start developing Lethal Autonomous Weapon Systems to maintain its military superiority, regardless of any moral objections.

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[133] James 4:17 (International Standard Version Bible)

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